

has been collected by Reverend Ernest Lapage on the sandy shore of a lake and on sand-dunes near Naknek on the Alaska Peninsula. Plants of various sizes were found by him, varying from the large plant described below to the small ones measured and described in the original description.

The stems branch in radial fashion from the top of the tap-root, creeping on the sand, 10 to 30 cm. long, composed of 4 to 6 robust sections, thickened and tapering toward the distal end and 3 to 6 cm. long; ocreae cup-shaped, hyaline or opaque, sometimes with green veins, or smooth, inconspicuously edged with fine bristles, evanescent; leaves lanceolate with a brown spot in the center, tapering to the petiole, 3 to 7 cm. long, 5 to 20 mm. wide.

This description is based on Lepage no. 24111, collected August 28, 1948.

THE FRUIT CHARACTER OF STROPHANTHUS, SECTION SYNCLINOCARPUS

Joseph V. Monachino

The fruit of Strophanthus Bullenianus was described and figured by M. T. Masters in the Gardeners' Chronicle in 1870. It is present on the Kew sheet of Mann 2247, which I consider the type collection of the species.

While no one has hesitated to accept the flowers of S. Bullenianus as genuine Strophanthus, the fruit of the type material of this species, which is detached, has been hitherto adjudged a mixture and rejected altogether from the genus by all outstanding taxonomists who have studied it. This is no wonder, for the long, slender mericarps of S. Bullenianus are clearly convergent, subparallel in drying, whereas those intimately associated with Strophanthus as a whole are strongly divaricate. The seeds of S. Bullenianus are likewise extremely unusual. The seed-coat is closely pubescent with short appressed hairs, as is common in other members of the genus, but is also invested by matted long hairs of the coma. The coma has the appearance of a wad of wool, rather than of distinct and straightish silky bristles. The awn is embedded in the coma. Botanists have with justice, indeed, thought it incredible that such fruit and seeds should actually belong to a Strophanthus.

Otto Stapf (Fl. Trop. Afr. 4 (1): 175. 1902) wrote: "The fruit figured by Masters belongs to a species of Pleioceras." Gilg (in Engler, Monogr. Afr. Pfl.-Fam. 1903: 38) wrote that the seed sent to him by Masters was not of Strophanthus.

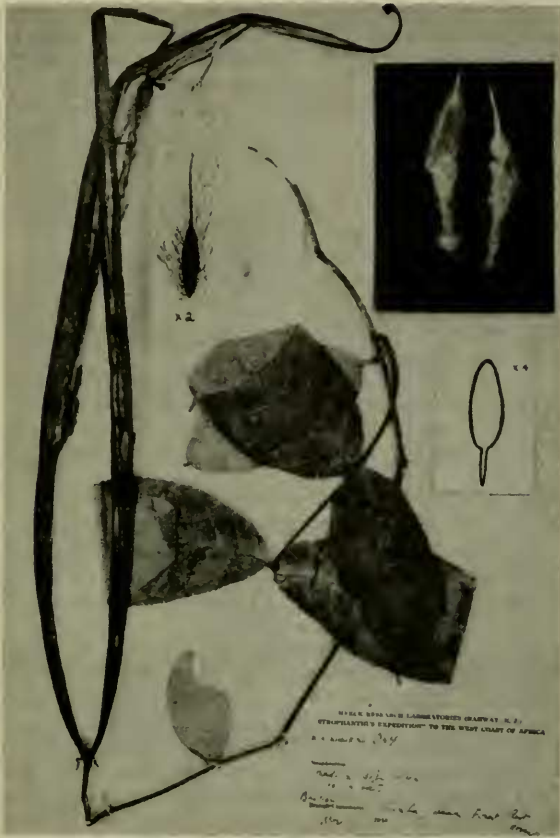


Plate 1

Strophanthus Bullenianus Mast.

R. D. Meikle, at the Herbarium of the Royal Botanic Gardens at Kew, has recently (August, 1950) examined the type sheet of S. Bullenianus and has communicated to me: "...the fruit and seeds of other African Strophanthus spp. are, as a whole, so uniform and distinctive, that one hesitates to accept those of 'S. Bullenianus' as genuine." The seeds, he writes, "...certainly resemble those of Pleioceras or Wrightia more than true Strophanthus. In size, indumentum, etc., they are curiously unlike other Strophanthus seeds, and I find it difficult to believe that they really 'belong' to the flowering specimens."

Not satisfied with the evidence for excluding the type fruit, I enquired of Kew: Has the fruit of S. Bullenianus been definitely matched with that of any other plant? Are there, for the purpose of drawing comparisons, any fruiting specimens of S. erythroleucus, S. Wildemanianus, and S. parviflorus, species which I believe to bear close affinity with S. Bullenianus? Are the cotyledons of S. Bullenianus convolute, as they are in Pleioceras?

All or nearly all of the African Apocynaceae fruits and seeds preserved at Kew were examined by Meikle and he found nothing to match that of S. Bullenianus. There are no fruits of S. erythroleucus, S. Wildemanianus, and S. parviflorus at Kew.

Regarding the character of the cotyledons Meikle wrote: "I have examined one of the two preserved seeds. The results are not very helpful, for the cotyledons are neither plane as in Strophanthus nor convolute as in Pleioceras, but somewhere intermediate between the two, i.e. plane above and convolute below."

The question of the authenticity of the S. Bullenianus fruit would still be controversial, with the preponderance of evidence apparently against authenticity, were it not for a fruiting specimen of S. erythroleucus collected by L. J. Brass and E. F. Woodward on the Upjohn-Penick Expedition of 1949-1950. The specimen was obtained from the same vine which had provided the flowering material collected by B. A. Krukoff and C. W. Chew (thanks are due to Messrs. Brass and Woodward for this information, as well as for the excellent and copious field data, often accompanied by photographs, presented with their interesting collection). I have examined the fruiting and flowering plants and am sure that they belong to the same species. This is therefore the first instance where fruit and flower are positively associated in a species of the S. Bullenianus affinity. The fruit and seeds of S. erythroleucus resemble unmistakably those of S. Bullenianus. They thus clearly indicate the genuineness of the original fruit collection of the latter species.

As additional evidence, new fruiting material of S. Bullen-

ianus has been discovered by me amongst the unidentified specimens collected by Mr. B. A. Krukoff. This specimen is perhaps the basis for the reference to the species made by Krukoff and Letouzey (Rev. Inst. Bot. Appl. 329—350: 125, 132. 1950). It may, however, be argued as follows that these authors' concept of S. Bullenianus was founded on material other than that examined by me. In their "Clef de determination d'apres les fruits" S. Bullenianus is distinguished from S. hispidus on vegetative characters and "follicules atteignent 60 cm de long, termines en une extrémite ligneuse epaissie." Their description notes merely that the follicles reach up to 60 cm. in length. No collection is cited, and nothing is said by Krukoff and Letouzey regarding the very remarkable fruit and seed character of S. Bullenianus. In their citation of the original publication of the species they exclude the fruit: "sauf fruits." The plant is associated by them with others such as S. hispidus and S. sarmentosus which bear no affinity with S. Bullenianus. Mr. Krukoff has, in his own hand, crossed out the name Strophanthus printed on the label of his specimen of S. Bullenianus examined by me.

On the basis of the striking fruit and seed character of S. Bullenianus and S. erythroleucus, supported by their floral structure, I propose a new section in the genus Strophanthus. The generic concept regarding fruit and seed morphology must therefore be amplified to embrace the following:

STROPHANTHUS, Sect. SYNCLINOCARPUS Monachino, sect. nov.

Frutices scandentes; lobis corollae caudatis; antheris prope apicem tubi corollae insertis, summitatibus sterilibus obtusis; mericarpis gracilibus convergentibus non divaricatis; coma tunicam seminis circumdata.

Vines; corolla-lobes tailed; anthers inserted near the summit of the corolla-tube, their sterile tips short, the basal lobes obtuse; mericarps slender, convergent, not divaricate; coma investing the seed-coat.

The type species of the section is Strophanthus Bullenianus Mast., Gard. Chron. (1870) 1471, fig. 257.

The section Synclincarpus comprises four species. S. Bullenianus was the first described and is the best known in the section. It has been collected in southern Nigeria, the Cameroons, and Gabon. Thomas Christy (New Commercial Plants and Drugs, No. 9, p. 61) referred to the fruits and seeds of this species in 1886. He received material in the form of a mass of a fragmented follicle and woolly seed tufts, with very few seeds. S. Wildemanianus Gilg differs from S. erythroleucus Gilg, described at the same time, merely in the slightly longer tails of its corolla-lobes and in the slightly longer petioles. It is presumably known only from the type collection consisting

of flowering material obtained in 1901 by Gillet in Kimuenza, lower Congo. The cotypes of S. erythroleucus were collected at Gross-Batanga, Cameroons. C. W. Chew has seen living plants of the species at Port Harcourt, Nigeria, and in the vicinity of Douala, Cameroons. It is desirable to know more about variation in S. Wildemanianus to properly evaluate its distinction from S. erythroleucus. S. parviflorus Franchet, described in 1893, the fourth member of the section Synclinocarpus, is less closely allied with S. Bullenianus. I have examined eighteen collections of this, but not one was in fruit. It grows in the lower Belgian Congo, Gabon, and Angola. When its fruits and seeds eventually become known, it will be interesting to see whether the flower character has afforded a reliable criterion for prediction of the sectional position of the species.

Further study is needed in the morphology of the cotyledons in the species of section Synclinocarpus. Mention has already been made that R. D. Meikle found the cotyledons of the type of S. Bullenianus plane above and convolute below. I have examined the cotyledons of all Strophanthus species which provided adequate seeds and found them clearly plane. Very rarely abnormal seeds showed warped cotyledons, but not truly convolute. I dissected four mature seeds of the Krukoff collection of S. Bullenianus and observed these also to have completely plane cotyledons. The seeds of S. erythroleucus available to me are too immature to permit proper study of their cotyledons.

The individual mericarps of the two species whose fruits are known in the section Synclinocarpus resemble somewhat those of S. Barteri, but are longer. The seed coma of S. erythroleucus is less woolly in appearance than that of S. Bullenianus. What greater divergence from the type of the section S. parviflorus will present remains to be seen.

S. Bullenianus and S. Ledieni have been placed in section Eustrophanthus Pax, subsection Acuminati Pax (in Engler, Bot. Jahrb. 15: 367. 1892). The two species are incongruous. The latter must be associated with S. Emini, from which it differs rather strikingly in its fruit and little in its habit. The flowers of S. Ledieni and S. Emini are practically identical, and one may wonder whether it would be better to draw varietal, rather than specific, distinction between the two.

One may also wonder what importance is to be attached in general to the fruit in evaluating rank in Strophanthus. Follicular differences in this genus are sometimes not supported by floral distinctions. For instance, S. sarmentosus is represented in its eastern and southern range, the Ubangi, Belgian Congo, and Angola, by a variety with follicles very densely lenticellate. Conversely, it appears, judging from the few fruiting specimens thus far examined, that S. gardeniiflorus is merely an eastern variety of S. Tholloni with non-lenticellate

or but sparsely lenticellate follicles, the flowers being the same. I have observed rare instances where specimens of S. Emini that are alike even in fruit show upon dissection of the seeds puzzling differences in the cotyledons. As a rule, the base of the cotyledons in S. Emini is wedge-shaped and merges into the short peg-like conic radicle. In rare cases the cotyledons are rounded at the base and the radicle is longer, cylindrical, and distinct.

It is seen that the fruits are quite variable in Strophanthus and even marked differences in them sometimes define merely varieties, and thus fruit characters as principal bases for establishing sections should be selected with great caution.

F. Pax in his treatment of Strophanthus (in Engler, Bot. Jahrb. 15: 362--386. 1892) recognized three sections and eight subsections in the genus. One of the sections had been proposed by Baillon (Bull. Mens. Soc. Linn. Paris 1 (95): 757. 1888). Franchet (Nouv. Arch. Mus. Paris, ser. 3, 5: 249, 250. 1893) recognized only two of these sections and altogether disregarded subsections. Gilg (in Engler, Monogr. Afr. Pfl.-Fam. 1903) accepted the same two sections, none of Pax's subsections, and erected three subsections of his own. He proposed the subsection Roupellia (which Stapf, in 1902, Fl. Trop. Afr. 4 (1): 168 had treated as a section, and Wallich and Hooker, in 1849, Bot. Mag. pl. 4466, as a genus) to accommodate S. gratus, S. Tholloni, and S. gardeniiflorus. He submerged the subsection Christya, a group that is among the most worthy of sectional rank. Recently M. Pichon (Mem. Inst. Sc. Madagas., ser. B, 2 (1): 62. 1949) re-instated Christya in the generic category and elevated the section Roupellina to the rank of a genus.

It is thus seen that there has been no uniformity in the evaluation of the various elements of Strophanthus. The section Synclinocarpus described in the present paper is the first section in the genus to be proposed since 1902, and the first in the group ever to be based primarily on fruit character.

Explanation of plates

- 1 -- S. Bullenianus Mast. B. A. Krukoff 064, British Cameroons, Kumba, near Forest Rest House, November, 1949.
- 2 -- S. erythroleucus Gilg. J. L. Brass & E. F. Woodward 20834, French Cameroons, Wouri River, about 9 or 10 km. southeast of Douala, December, 1949.
- 3 -- S. erythroleucus Gilg. B. A. Krukoff & C. W. Chew 200, French Cameroons, Douala, Bois des Singes, November 25, 1949.